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No. 2



FISHING INFORMATION

Southwest Fisheries Center-La Jolla, California



U.S. DEPARTMENT OF COMMERCE
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NATIONAL MARINE FISHERIES SERVICE
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FEBRUARY 1976 , No. 2



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PREFACE

This publication, Fishing Information, appears monthly and contains 1) fishery advisory information, 2) a narrative description of pertinent surface temperature conditions, 3) charts of winds and pressures for the eastern North Pacific, 4) charts of sea surface temperature for the North Pacific and eastern tropical Pacific, and 5) charts of subsurface temperature structure in the eastern North Pacific.

A supplement to Fishing Information appears at 15-day intervals throughout the year. This is a chart of sea surface temperature (contoured at 2°F (1°C) intervals) from Baja California to Vancouver Island out to about 135°W. Special bulletins are published in conjunction with the 15-day sea surface temperature charts which include short-term projections of albacore distribution and locations of productive fishing areas, information on oceanographic and atmospheric conditions, and other information as is appropriate during the albacore fishing season.

The Secretary of Commerce has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this publication approved by the Office of Management and Budget, August 20, 1973; this approval expires June 1976.

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ENVIRONMENTAL CHARTS ANALYZED BY:

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Scripps Institution of Oceanography, La Jolla, California

Fishing Vessels, *Bold Contender*, *Cabrillo*, *Caribe*, *Carol S.*, *Carol Virginia*, *Cheryl Marie*, *City of San Diego*, *Conquest*, *Danica*, *Elsinore*, *Frances Ann*, *Gina Karen*, *Jo Linda*, *Kathleen*, *Lucky Strike*, *Marco Polo*, *Maria C.J.*, *Maria Elena*, *Marietta*, *Marla Marie*, *Mary Barbara*, *Missouri*, *Pan Pacific*, *Raefello*, *Rosa Olivia*, *San Juan (WX8016)*, *San Juan (W17714)*, *Santa Rosa*, *Theresa Ann*, *Trinidad*, *Venturous*, and *Voyager*.

Expendable bathythermograph and salinity observations are made by the mates and engineers of the *Hawaiian Enterprise* and *Hawaiian Queen* of Matson Navigation Co. The data are processed under supervision of D.R. McLain at the NMFS Pacific Environmental Group, Monterey, using computer facilities of the Fleet Numerical Weather Center. The project is partially supported by the National Science Foundation and the Office of Naval Research under Government NAonr-9-74.

Sea Surface Temperature and Environmental Conditions

N. CLARK AND F. MILLER

Eastern North Pacific

Seasonal cooling of the surface layer of the eastern North Pacific occurred at a near-normal rate, with sea surface temperatures dropping 1 to 2°F (0.6 to 1.1°C) from January values. Exceptions to this cooling trend occurred west of Baja California out to 125°W and off the southern and central California coasts where temperatures rose slightly during February.

The sea surface temperature anomaly pattern for February closely resembles that of January and the one that persisted throughout 1975. The large area of 1 to 3°F (0.6 to 1.7°C) above-normal temperatures expanded northward during the month and covers the area between 25°N and 50°N and 135°W and 165°W. Major changes in the anomaly pattern occurred between 20°N and 30°N and 165°W and 180° where 1 to 3°F (0.6 to 1.7°C) above-normal temperatures dropped to slightly below-normal values and west of Baja California where 1 to 3°F (0.6 to 1.7°C) below-normal values rose to slightly below or slightly above-normal values. Below-normal temperatures continued over much of the Gulf of Alaska and off the Canadian and U.S. west coasts.

A strong high pressure cell with sea level pressures up to 6 millibars above normal covered most of the eastern North Pacific south of 40°N during February. A ridge of high pressure also extended northeastward over the western U.S. Sea level pressures were below normal north of 40°N and over the Gulf of Alaska due to the passage of storm systems during the month.

Western North Pacific

The greatest change in the western North Pacific sea surface temperature anomaly pattern during February 1976 occurred east of Honshu where a region of 1 to 2°F (0.6 to 1.1°C) below-normal temperatures increased in size and dropped to 2 to 4°F (1.1 to 2.2°C) below-normal values. Other changes occurred in an area between the Philippine Islands and Japan where temperatures increased to 2 to 6°F (1.1 to 3.3°C) above-normal values and southeast of the Kamchatka Peninsula where below-normal temperatures increased to slightly above-normal values.

Eastern Tropical Pacific

From January to February sea surface temperatures (SST) changed less than 1°F (0.6°C) between 5°N and 30°N. The largest seasonal increase of 2 to 3°F (1.1 to 1.6°C) takes place along the western boundary of the Peru Current from 5°N to 20°S between 85°W and 115°W. The north-south temperature gradient in the equatorial front, which lies along the equator east of 110°W, is normally weaker in February than in any other month, especially between Ecuador and the Galápagos Islands.

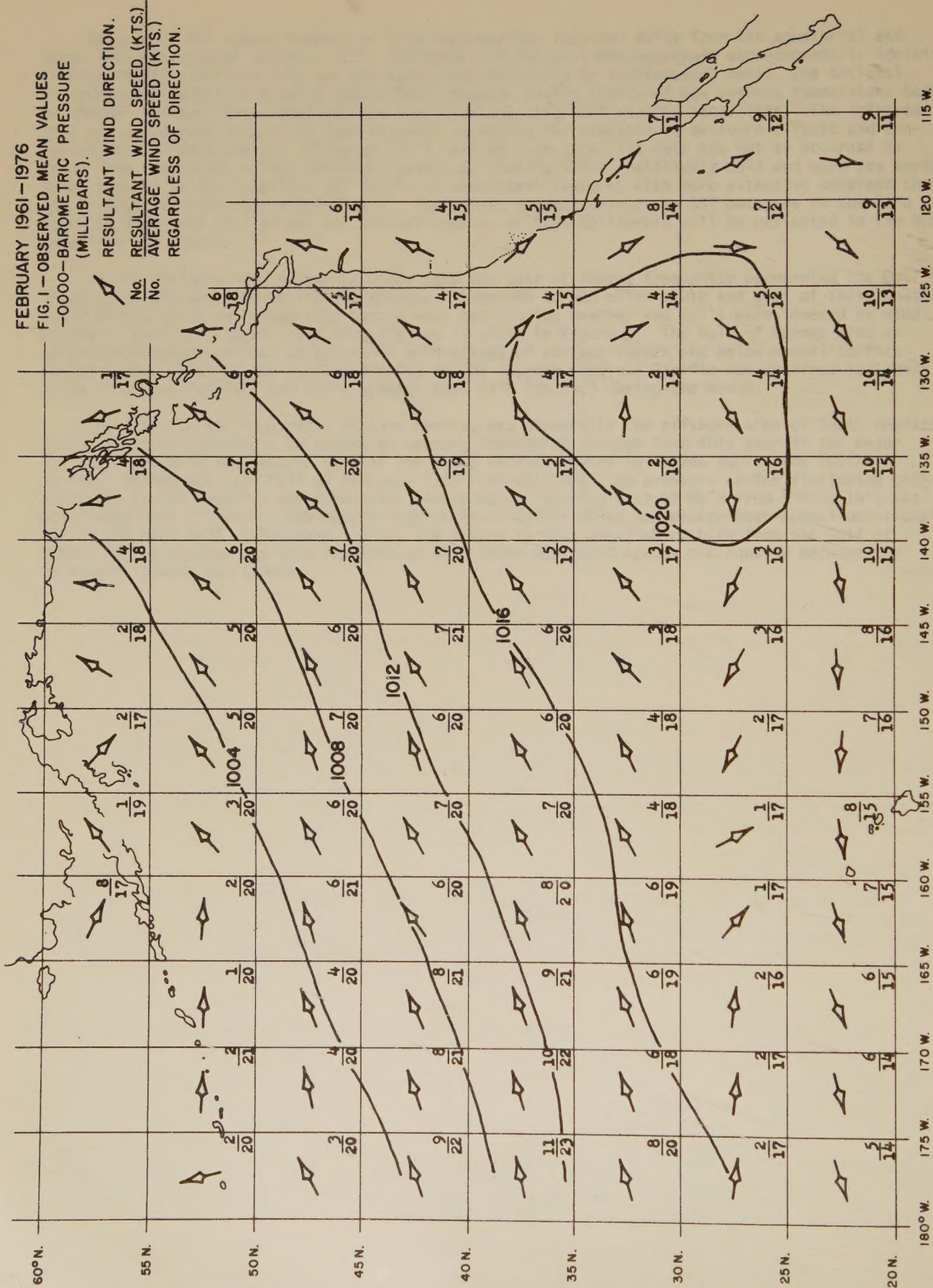
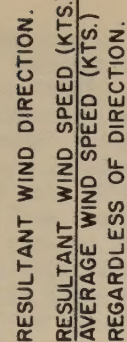
The most outstanding feature of the February 1976 SST pattern (Figure 8) and the resulting SST anomalies (Figure 9) is the close resemblance to the corresponding charts for February 1975. During February 1975 and 1976 above-normal warming took place between 85°W and 90°W and on both sides of the equator. The equatorial front between 85°W and 95°W was very weak in February of 1975 and 1976. The SST's increased 2 to 4°F (1.1 to 2.2°C) since January 1976 with positive anomalies (Figure 9) expanding westward from the coast between 5°N and 5°S as far west as 100°W. Only one small area of negative SST anomalies remained in this region south of the Galápagos Islands. In the equatorial regions east of 95°W where the SST's exceeded 79°F (26.1°C) the tropical fishing fleet made exceptionally good catches of yellowfin tuna during February 1976. Along the coast of Peru SST's appeared to be below normal along the inshore area, but offshore more than 100 miles SST's showed a seasonal warming trend slightly above normal.

Because of the sparse numbers of ship observations received daily from the equatorial and South American coastal regions, SST's obtained from National Oceanographic and Atmospheric Administration (NOAA) satellite data are now being used routinely as supplemental data. The National Environmental Satellite Service (NESS)/NOAA prepares weekly charts of sea surface temperature based on thermal infrared data received from the polar orbiting NOAA weather satellites. The infrared data are calibrated into earth temperatures, corrected for atmospheric moisture effects and contoured onto gridded charts. Although SST's derived from satellite data are not as accurate as those from commercial ships, research vessels or fishing boats, relatively cold and warm sea surface areas show up in the satellite SST charts as consistent features with more extensive coverage than can be obtained with conventional data. Therefore, unusual changes in SST patterns in the Peru Current, along the equator and off Central America or Baja California will be reflected in the NESS satellite SST charts.

During February 1976 northerly winds from the Gulf of Mexico frequently penetrated the Gulf of Tehuantepec and Costa Rican fishing grounds. From 300 to 500 miles south and west of these coastal areas strong winds and rough seas caused very bad fishing weather and SST's were lowered by wind mixing as much as 4 to 6°F (2.2 to 3.3°C) as is shown in Figure 9. The Gulf of Panama also experienced frequent periods of extensive wind mixing of surface layers and below-normal surface temperatures. Most of the surface fishing in the eastern tropical Pacific was confined to those areas which consistently had SST's greater than 79°F (26.1°C) during the month.

The SST's in the equatorial eastern Pacific and especially the offshore area of South America to 20°S will be vulnerable to extensive warming from March through June this year if the major pressure system in the eastern part of the South Pacific begins to weaken during the southern winter. During the last half of February 1976 this southern high pressure center fluctuated considerably in its location and intensity. Above-normal warming east of 85°W from 5°N to 10°S was associated with a southern hemisphere high pressure center which was weaker-than-normal occasionally during the last half of February. Also, the strong surface winds which blew from the Gulf of Panama to the equator may have transported warm water southward across the equator between the Galápagos Islands and Ecuador.

FIG. 1—OBSERVED MEAN VALUES
—0000—BAROMETRIC PRESSURE
(MILLIBARS).



FEBRUARY 1976

FIG. 2 — OBSERVED VALUES

— 0000—BAROMETRIC PRESSURE

(MILLIBARS).

RESULTANT WIND DIRECTION.

RESULTANT WIND SPEED (KTS.)

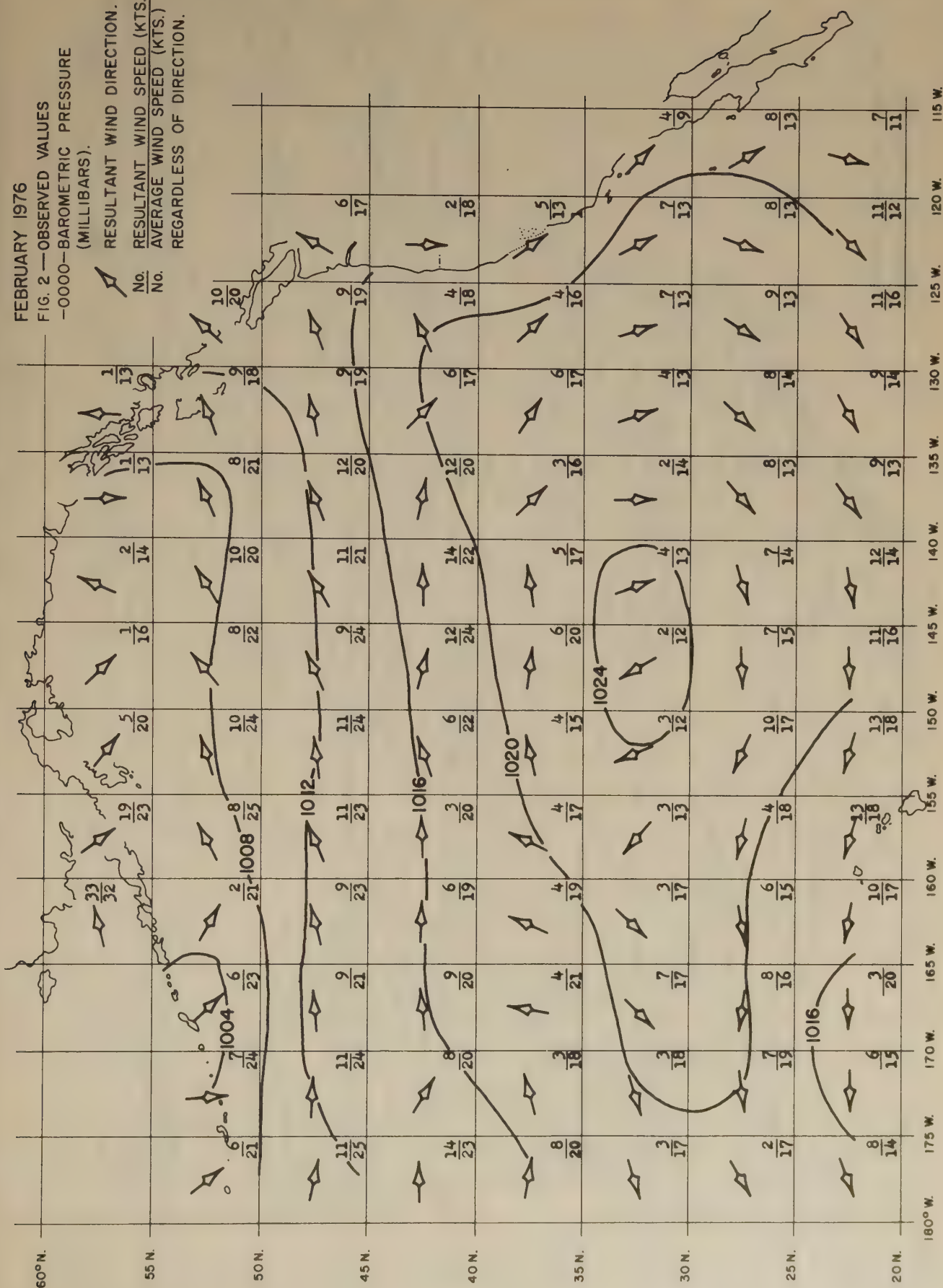
AVERAGE WIND SPEED (KTS.)

REGARDLESS OF DIRECTION.



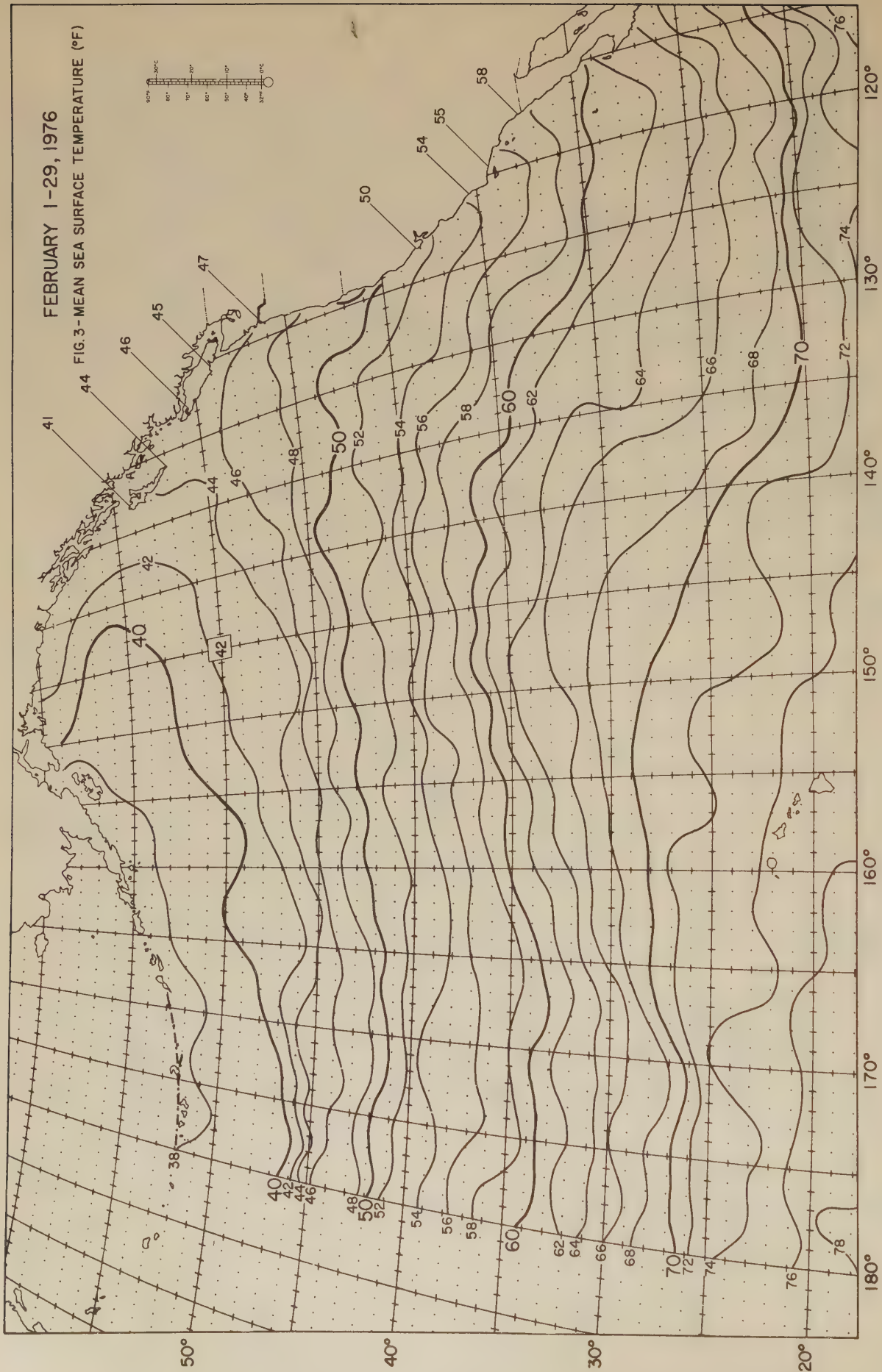
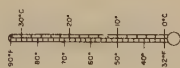
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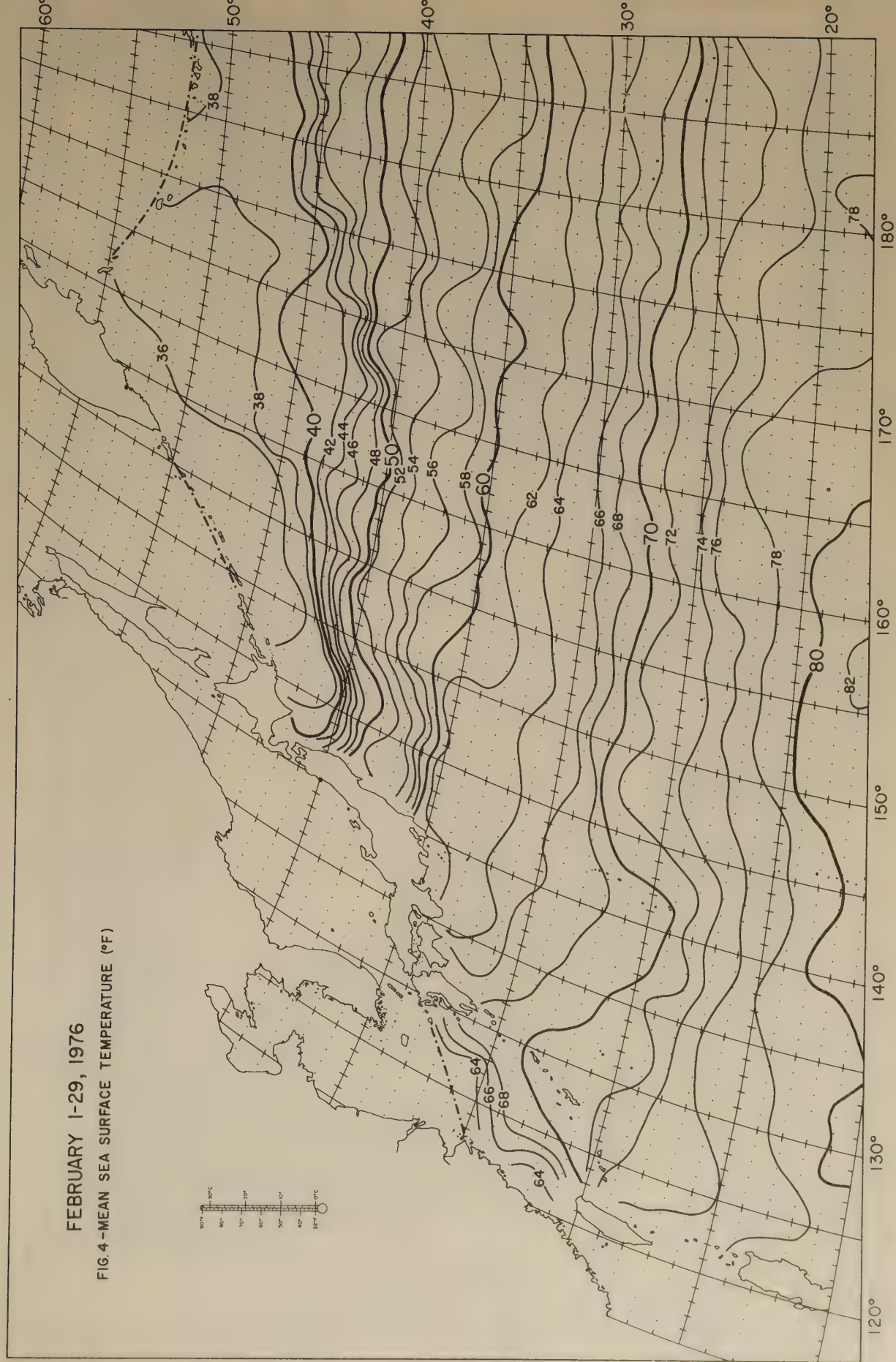
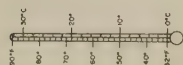
FEBRUARY 1-29, 1976

FIG. 3-MEAN SEA SURFACE TEMPERATURE (°F)



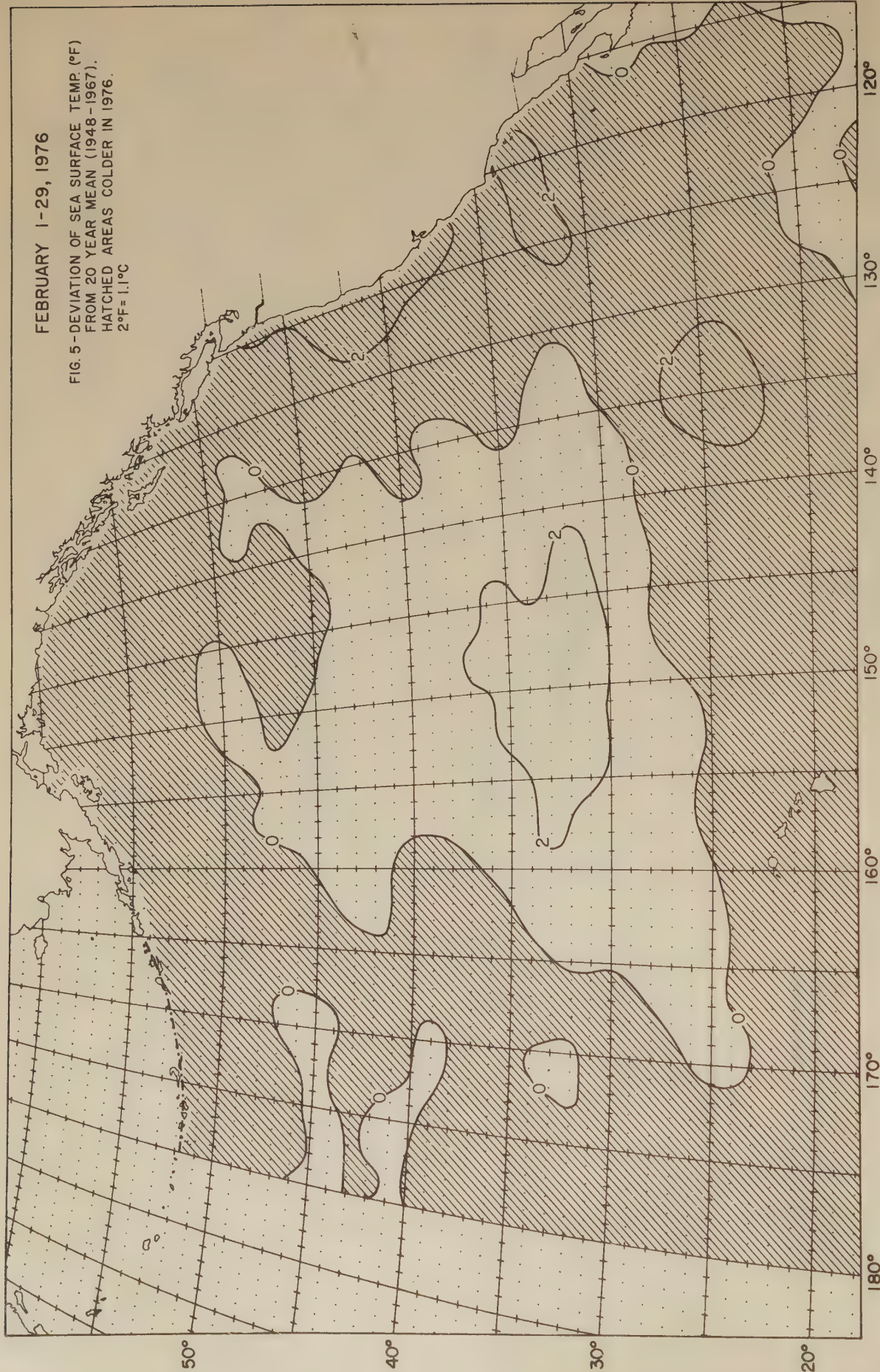
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FIG. 4-MEAN SEA SURFACE TEMPERATURE (°F)



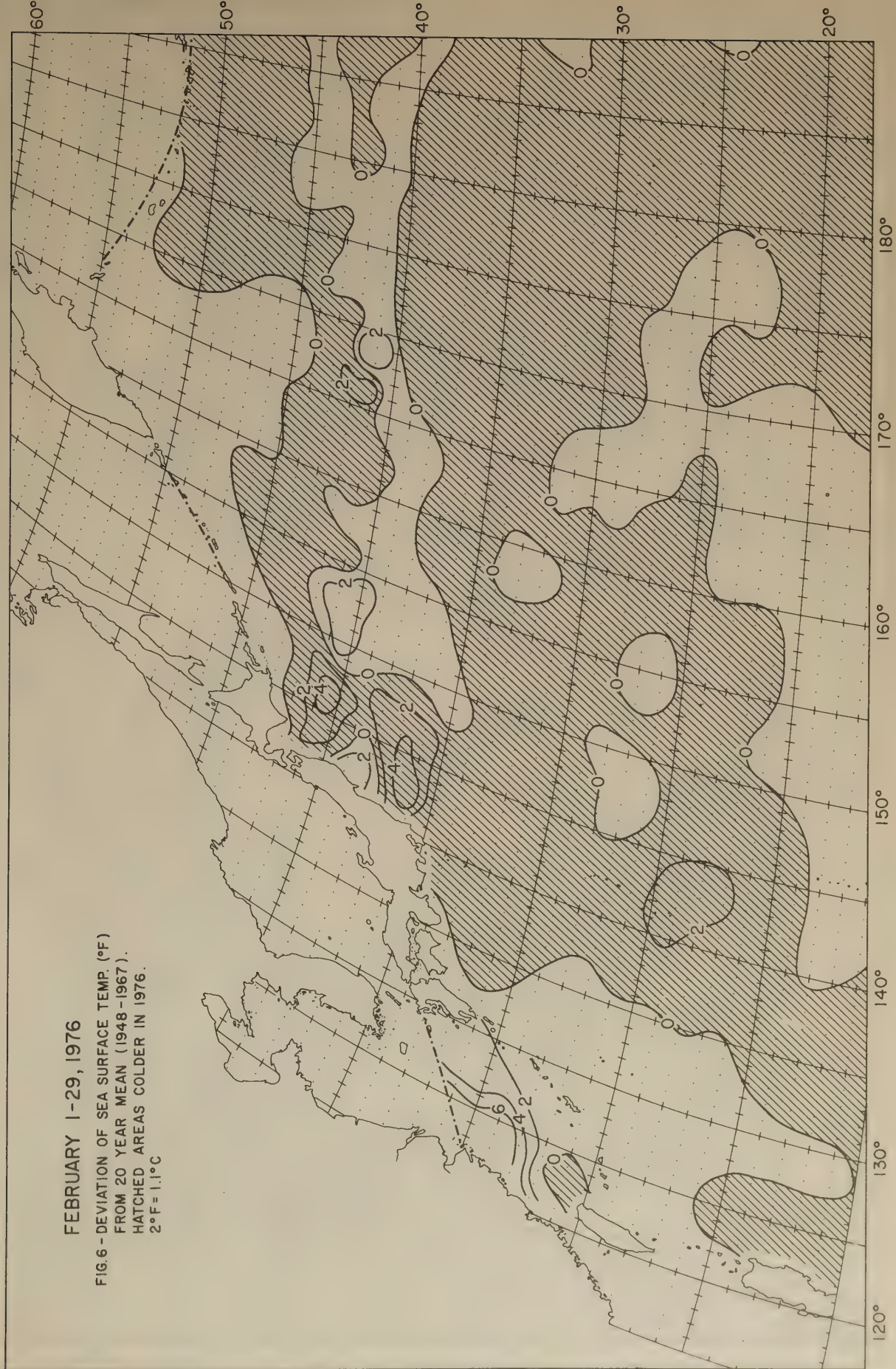
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FIG. 5-DEVIATION OF SEA SURFACE TEMP. (°F)
FROM 20 YEAR MEAN (1948-1967).
HATCHED AREAS COLDER IN 1976.
2°F = 1.1°C



FEBRUARY 1-29, 1976

FIG. 6 - DEVIATION OF SEA SURFACE TEMP. (°F)
FROM 20 YEAR MEAN (1948-1967).
HATCHED AREAS COLDER IN 1976.
2°F = 1.1°C



FEBRUARY 1-29, 1976

FIG. 7- DEVIATION OF SEA SURFACE TEMP.
(°F) FROM FEBRUARY 1975. HATCHED
AREAS COLDER IN 1976. $2^{\circ}\text{F} \approx 1.1^{\circ}\text{C}$

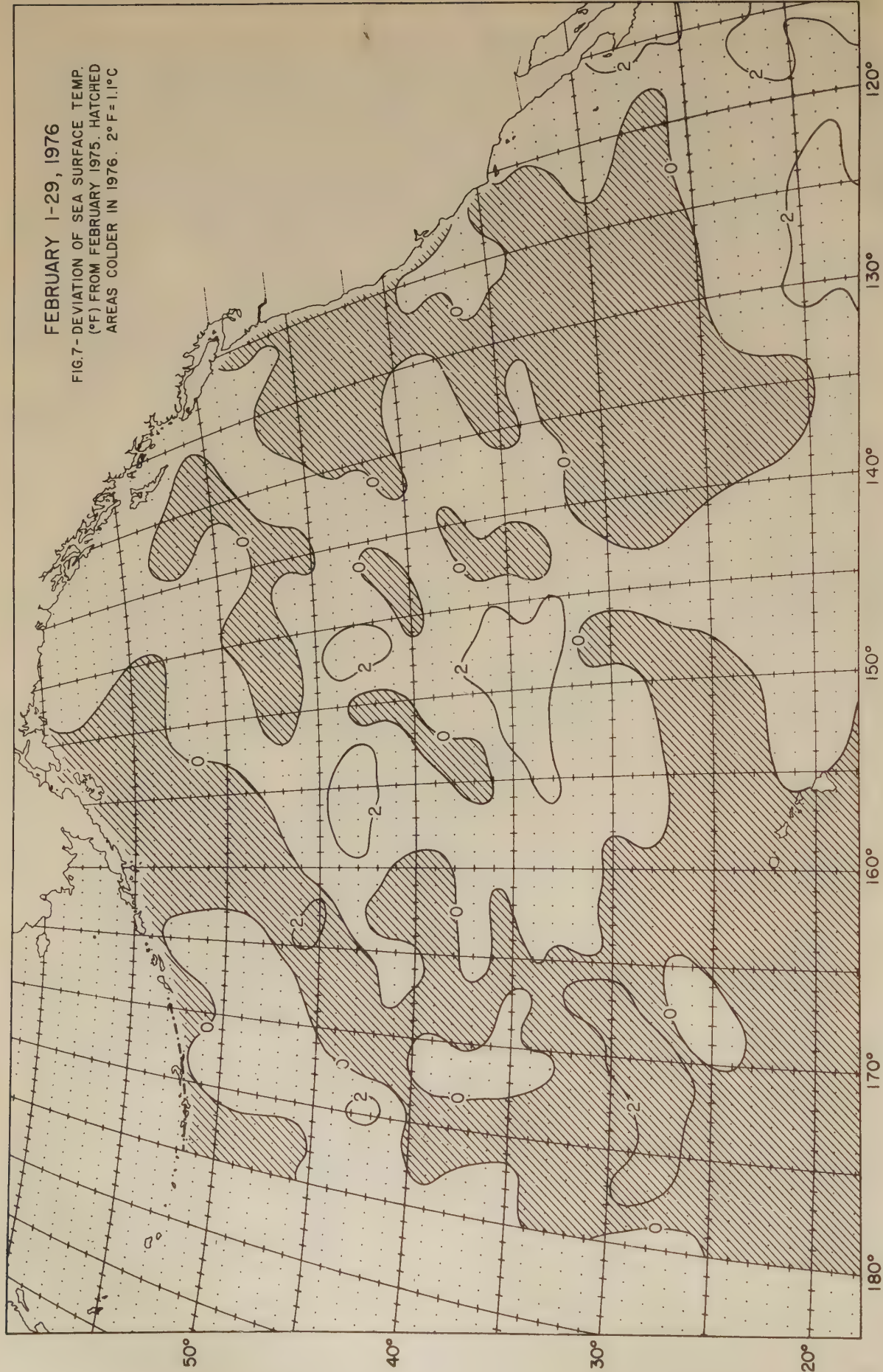


FIG. 8-MEAN SEA SURFACE TEMPERATURE
(°F). DASHED LINES INDICATE
SPARSE DATA.

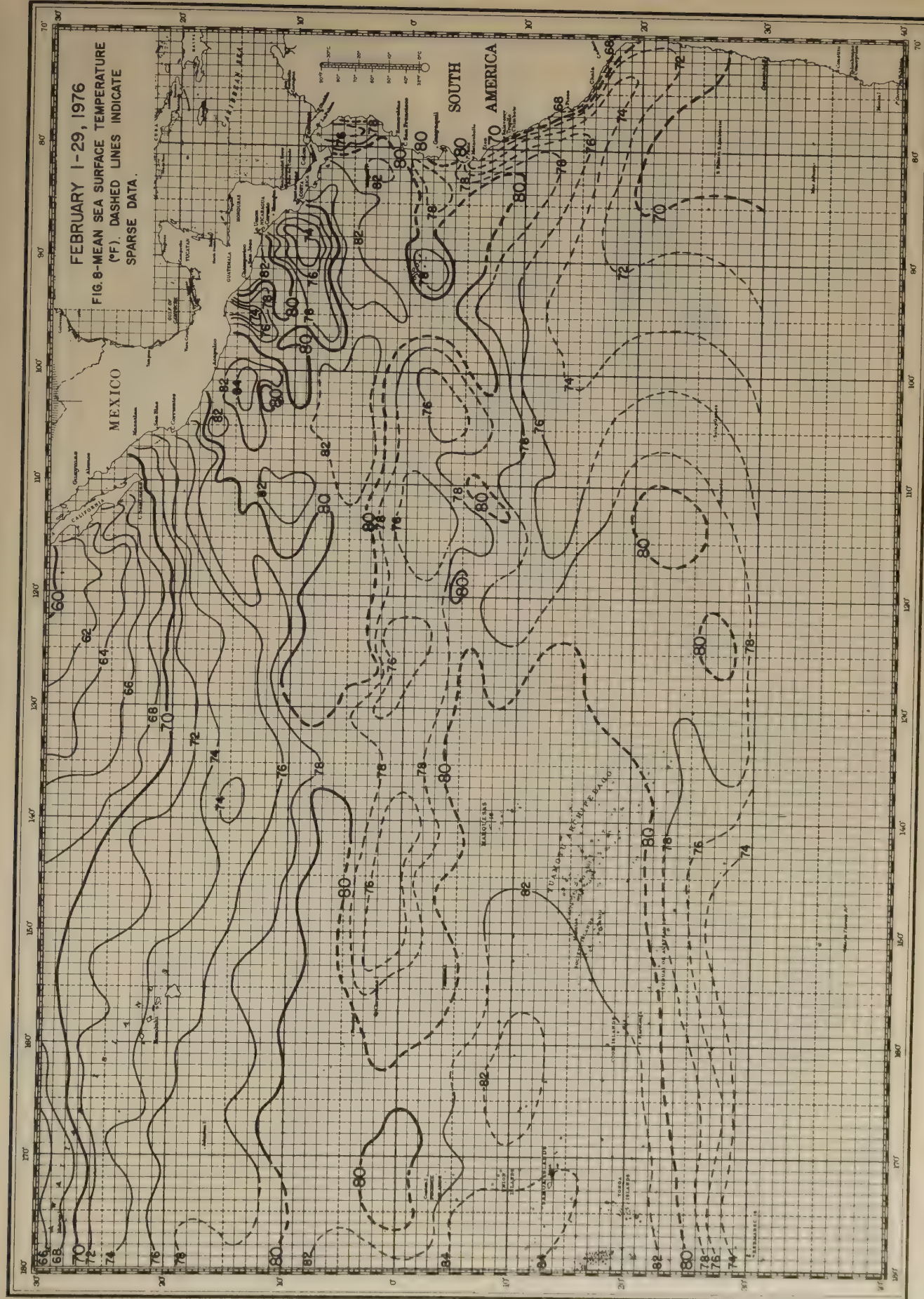
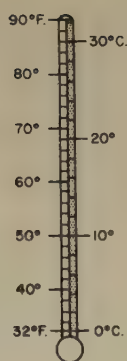




FIGURE 10



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VOYAGE 174

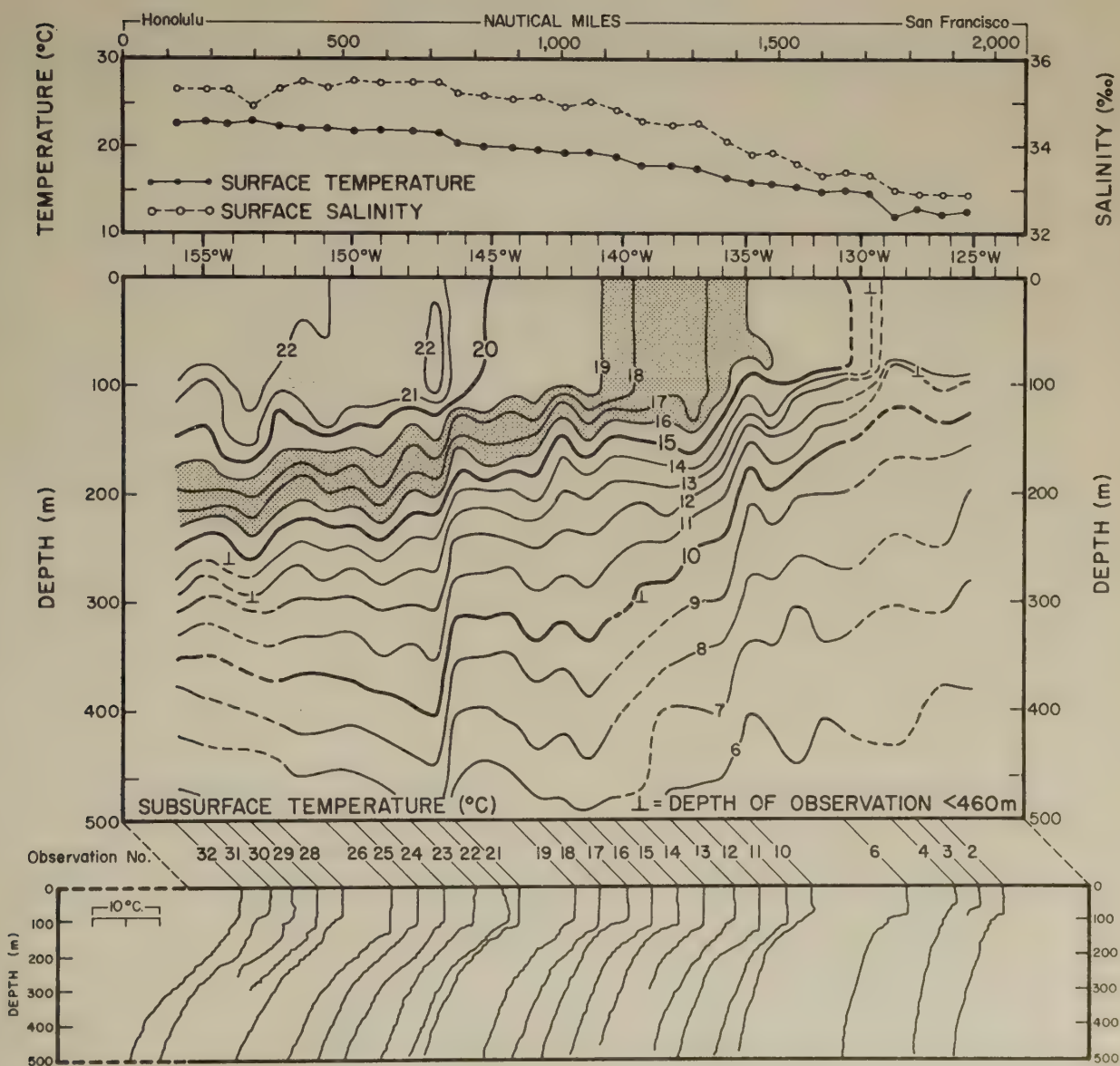


FIGURE 11

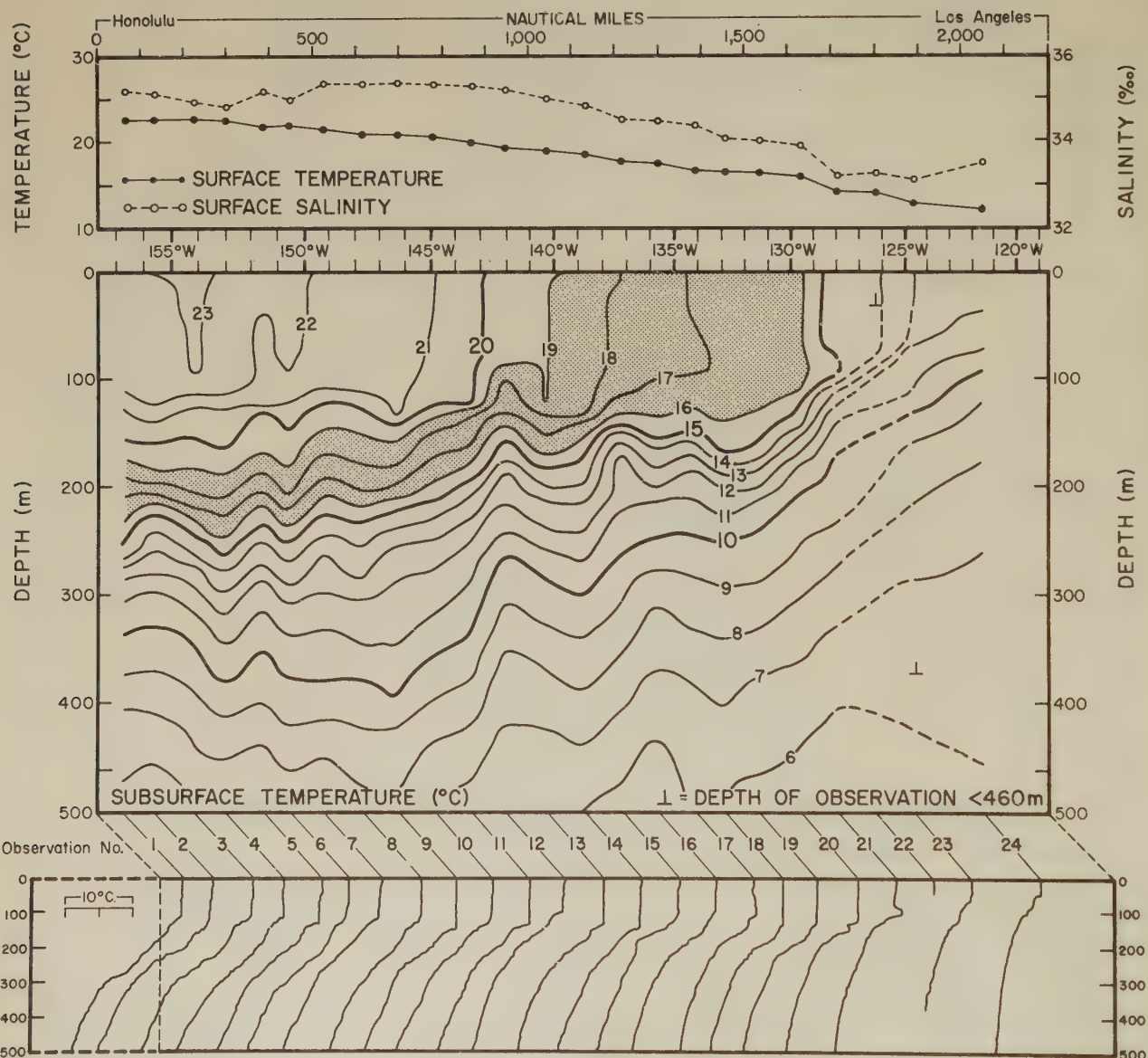


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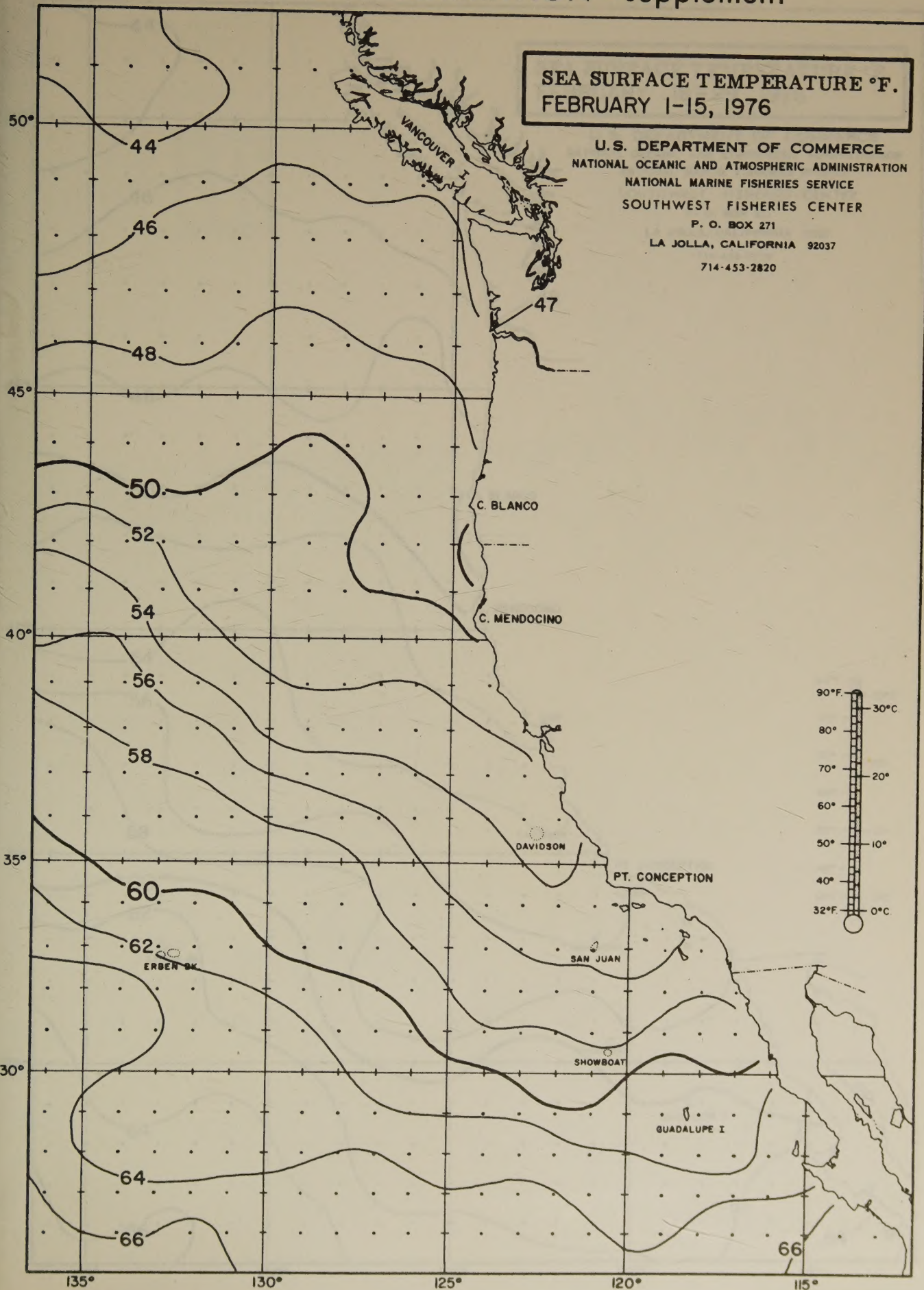


THIRD CLASS

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SEA SURFACE TEMPERATURE °F.
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